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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/731,105

12/10/2003

Tsuyoshi Kaneko

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EXAMINER

SONG, SARAH U

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/731,105

Applicant(s)

KANEKO, TSUYOSHI

Examiner

Sarah Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2005 and 24 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,9-11 and 13-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-11 and 13-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's communications filed on October 12, 2005 and October 24, 2005 have been carefully considered and placed of record in the file. Claims 1-4, 9, 18 and 20 are amended. Claims 1-6, 9-11 and 13-30 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirano et al (JP 60-156023 provided by Applicant).**

4. Regarding claims 1 and 2, Hirano et al. discloses a connection structure, comprising: an optical element 6 including an optical surface; an optical fiber 8 having a first portion 3, 7 and a second portion 1, 2, a part of the second portion being enclosed by the first portion, the second portion having an exposed segment; and a connecting part 4 that joins the optical surface and only the exposed segment of the second portion of the optical fiber. The exposed segment has an end surface, and the connecting part joins the optical surface and only the end surface of the exposed segment of the second portion of the optical fiber. See Figures 1-3, for example.

5. **Claims 3, 4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al. (U.S. Patent 5,018,817 newly cited).**

6. Regarding claims 3 and 4, Suzuki et al. discloses a connection structure, comprising: an optical element 18 including an optical surface 18a; an optical fiber 14 having a core 14a and a

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clad (surrounding the core 14a), a part of the core being enclosed by the clad, the core having an exposed surface 14c; and a connecting part 10 that joins the optical surface and only the exposed surface of the core of the optical fiber. The exposed surface 14d has an end surface 14b of the exposed surface of the core of the optical fiber. See column 10, lines 57-68; Figure 5.

7. Regarding claim 13, the method of forming the device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano et al.**

10. Regarding claim 27, Hirano et al. does not expressly disclose that the connecting part secures optical transmission between the optical element and the optical fiber without precise alignment of the optical element and the optical fiber. However, since the connecting part of Hirano et al. is a waveguide (see Abstract) thus guides light there through from one end to the other, one of ordinary skill in the art would have recognized that the connecting part resultantly secures optical transmission between the optical element and the optical fiber without precise alignment of the optical element and the optical fiber.

11. **Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al.**

12. Regarding claim 28, Suzuki et al. does not expressly disclose that the connecting part secures optical transmission between the optical element and the optical fiber without precise

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alignment of the optical element and the optical fiber. However, since the connecting part itself is formed with high precision (i.e. the fiber holding groove is provided with high precision), one of ordinary skill in the art would have recognized that the connecting part resultantly secures optical transmission between the optical element and the optical fiber without precise alignment of the optical element and the optical fiber since the coupling arrangement is passively achieved by the connecting structure.

13. Claims 5, 6, 9-11 and 14-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al.

14. Regarding claim 9, Suzuki et al. does not expressly disclose a sealant at the end surface covering an area that surrounds the connecting part. However, it is well known in the art to encase fiber-to-device couplers in a sealant for hermeticity. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an area that surrounds the connecting part covered by a sealant at the end surface for the purpose of providing hermeticity for improved device performance.

15. Regarding claims 5, 6, 10 and 11, Suzuki et al. does not expressly disclose the relative refractive indices of the core, clad, connecting part or sealant. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select appropriate material refractive indices since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. See MPEP 2144.07.

16. Regarding claim 14 Suzuki et al. also does not disclose a connecting part being composed of an ultraviolet curing resin. However, it would have been obvious to one having ordinary skill

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in the art at the time the invention was made to select any appropriate material since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. See MPEP 2144.07.

17. Regarding claim 15, Suzuki et al. discloses prior art connecting structure for connecting an optical fiber to an optical waveguide of light emitting elements or light sensitive elements. Furthermore, it is well known in the art to couple optical fibers to semiconductor light emitting devices, electroluminescent devices, or photodiodes on a substrate. Therefore, since the particular type of device lacks criticality, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the connecting structure of Suzuki et al. for coupling an optical fiber to any of the above devices as was well known in the art.

18. Regarding claims 16 and 17, Suzuki et al. does not expressly disclose a semiconductor chip electrically coupled to the optical element. However, it is known in the art that semiconductor light receiving or emitting elements require a semiconductor chip electrically coupled thereto in order to function properly. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a semiconductor chip electrically coupled to the optical element of Suzuki et al. in order to provide requisite drive signals to the device.

19. Further regarding claim 17, Suzuki et al. does not expressly disclose the optical fiber coupled to a light-emitting element on one end and a light-receiving element on the other. However, it is well known in the art for optical transmission fiber to comprise an emitter on one end and a receiver on the other end. Therefore, it would have been obvious to one having

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ordinary skill in the art at the time the invention was made to provide the emitter and receiver as claimed as requisite features of a complete optical transmission line.

20. Claims 18-22, 24-26, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi et al. (JP 09-197196 previously relied upon) in view of Ebeling et al. (U.S. Patent 6,773,169 previously relied upon).

21. Regarding claims 18-21, 29 and 30, Eguchi et al. discloses a connection method comprising (a) forming a connecting part precursor 3 by applying a liquid agent to at least one of an end surface of the optical fiber (or the core of the optical fiber) and an optical surface of the optical element; and (b) forming a connecting part by hardening the connecting part precursor while joining the end surface of the optical fiber (or the core of the optical fiber) and the optical surface via the connecting part precursor. Step (b) further comprises joining the end surface of the optical fiber (or the core of the optical fiber) and the optical surface via the connecting part precursor while making at least a part of the optical fiber face the optical surface. See Abstract and Figure 1.

22. Eguchi et al. does not disclose an end surface of the fiber having a convex part.

23. Ebeling et al. discloses a similar connection structure further comprising an end surface of the fiber having a convex part. See Figure 7. It is additionally noted that fibers having a convex end part (i.e. lensed fibers) are well known in the art for improving coupling efficiency.

24. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the fiber of Eguchi et al. to comprise the convex part of Ebeling et al. in order to improve coupling efficiency for optimal communications.

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25. Furthermore, Eguchi et al. and Ebeling et al. disclose that the connection structure secures optical transmission between the components without precise alignment of the components (Paragraph [0010] and abstract, respectively). That is, the disclosed connection structures of the prior art enable alignment between respective components without the necessity of high-precision pre-alignment structures or measurements, thereby simplifying the alignment procedure and thus reducing manufacturing costs.

26. Regarding claim 22, Figure 7 discloses the height of the end surface of the core being different from a height of an end surface of the clad.

27. Regarding claim 24, the connecting part precursor is hardened by charging energy. See Abstract.

28. Regarding claims 25 and 26, Eguchi et al. does not expressly disclose the optical element having a column section, and the optical surface being placed on the top surface of the column section. Ebeling et al. discloses a column section 33, and the optical surface being placed on the top surface of the column section. It would have been obvious to one having ordinary skill in the art at the time the invention was made to additionally provide the column section and the optical surface being placed on the top surface of the column section in order to improve durability by providing a protective covering to the light-emitting facet of the optical element.

29. Regarding claims 27-30, both Eguchi et al. and Ebeling et al. disclose that the connection structures secures optical transmission between the components without precise alignment of the components (Paragraph [0010] and abstract, respectively). That is, the disclosed connection structures of the prior art enable alignment between respective components without the necessity

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of high-precision pre-alignment structures or measurements, thereby simplifying the alignment procedure and thus reducing manufacturing costs.

30. **Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi et al. in view of Ebeling et al. as applied to claim 18 above, and further in view of Hayes et al. (U.S. Patent 5,707,684 previously relied upon).**

31. Regarding claim 23, Eguchi et al. discloses the method comprising dropping the liquid agent, but does not expressly disclose an ink-jet method.

32. Hayes et al. discloses that ink-jet methods for applying microscopic droplets are well known in the art.

33. Eguchi et al. and Hayes et al. are analogous art as pertaining to micro-optical components.

34. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of dropping the liquid agent to comprise an ink-jet method in order to improve the precision of the manufacturing method as taught by Hayes et al. See column 2, lines 8-34.

Response to Arguments

35. Applicant's arguments filed October 12, 2005 have been fully considered but they are not persuasive. Applicant states that one of ordinary skill in the art would not have been motivated to apply the teachings of either Eguchi or Ebeling in attempting to fashion a connection between an optical element and an optical fiber "without requiring accurate alignment between the optical element and the optical fiber" and makes reference to col. 1, lines 11-14 and col. 2, lines 1-13 of Ebeling. Examiner respectfully disagrees. It is noted that col. 1, lines 11-14 merely discusses

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disadvantages of prior art couplings. Col. 2, lines 1-13 discusses the method of Ebeling to overcome the prior art disadvantages, which clearly teaches that the connecting part achieves a connection between an optical element and an optical fiber “without requiring accurate alignment between the optical element and the optical fiber” as claimed, since the component “automatically positions” itself relative to the optical fiber (column 2, lines 15-17) by a “self-centering” effect (Abstract).

36. Applicant's arguments with respect to claims 1, 3 and their dependent claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

37. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

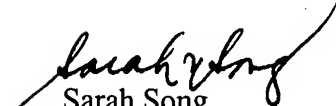
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Song whose telephone number is 571-272-2359. The examiner can normally be reached on M-Th 7:30am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sarah Song
Primary Examiner
Group Art Unit 2874